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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,527	04/01/2004	Nagesh R. Basavanhally	33-8-5	9904

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EXAMINER	
ROSE, KIESHA L	
ART UNIT	**PAPER NUMBER**
2822	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/06/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/06/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@hittgaines.com

Office Action Summary	Application No.	Applicant(s)	
	10/816,527	BASAVANHALLY ET AL.	
	Examiner	Art Unit	
	Kiesha L. Rose	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/9/07*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the request for reconsideration filed 9 January 2007.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 8 discloses the intermolecular forces are dipole-dipole forces. It is unclear what causes the dipole-dipole forces.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4,6,7,10-14,19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Brown et al. (U.S. Patent 6,340,822).

In re claims 1,7,10,13, Brown discloses a nano-interconnect structure (Fig. 6) that contains a first surface (20/12a/12b), a second surface (10',12a',12b'), a plurality of

nanostructures (4a/4b)disposed on at least one of the first surface and second surface and plurality of nanostructures configured to attach first surface and second surface using attractive forces and in a way such that nanostructures form at least a first conductive connection either thermal or electrical (Column 3, lines 50-55) between first and second surfaces. (In regards to the nanostructures being attached by an attractive force, as stated in applicant's specification (Page 3, lines 10-21) that there would be an attractive force (intermolecular force) if the first and second surfaces were formed by a circuit substrate or chip and the nanostructure was formed from a thermally or electrically conductive material then there would be an attractive force and the molecules from the first and second surfaces would have an intermolecular force to the conductive nanostructures. Therefore with the nanostructures of the prior art being a thermally or electrically conductive material and the first and second surfaces are a circuit substrate (Column 3, line 63) then they would be attracted by an attractive force (intermolecular force, Van der Waals)).

In re claims 2 and 11, the conductive connection comprises a thermal connection. (Column 3, lines 50-55)

In re claims 3 and 12, the conductive connection comprises an electrical connection. (Column 3, lines 50-55)

In re claim 4, a first plurality of nanostructures (4a) disposed on at least a first area of first surface (10) and a second plurality of nanostructures (4b) disposed on at least a first area of the second surface (10'), wherein first plurality of nanostructures and second plurality of nanostructures are adapted to transfer thermal or electrical energy

from the first plurality of nanostructures to the second plurality of nanostructures. (column 10, lines 24-27)

In re claims 6,14,19-20, the attractive force comprises an attractive intermolecular force. (In regards to the nanostructures being attached by an attractive force, as stated in applicant's specification (Page 3, lines 10-21) that there would be an attractive force (intermolecular force) if the first and second surfaces were formed by a circuit substrate or chip and the nanostructure was formed from a thermally or electrically conductive material then there would be an attractive force and the molecules from the first and second surfaces would have an intermolecular force to the conductive nanostructures. Therefore with the nanostructures of the prior art being a thermally or electrically conductive material and the first and second surfaces are a circuit substrate (Column 3, line 63) then they would be attracted by an attractive force (intermolecular force)).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown in view of Fuhrmann (EPO 1320111).

In re claim 9, Brown discloses a nano-interconnection structure (Fig. 6) that contains a first surface (10), a second surface (10'), a first plurality of conductive nanostructures (4a) disposed on said first surface; a second plurality of conductive nanostructures (4b) disposed on said second surface, wherein said first plurality of nanostructures and said second plurality of nanostructures are adapted to transfer thermal or electrical energy from said first plurality of nanostructures to said second plurality of nanostructures. (Column 3, lines 50-55) Brown discloses all the limitations except for the nanostructures configured to interleave each other. Whereas Fuhrmann discloses a MEMS device (Fig. 3) that contains nanowires (2) that are interleaved with each other. The nanowires are interleaved with each other for a more effective electrical contact area. (Column 1, lines 51-52) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Brown by incorporating the nanostructures to be interleaved with each other for a more effective electrical contact area as taught by Fuhrmann.

In re claim 18, Brown discloses the attractive force comprises an attractive intermolecular force. (In regards to the nanostructures being attached by an attractive force, as stated in applicant's specification (Page 3, lines 10-21) that there would be an attractive force (intermolecular force) if the first and second surfaces were formed by a circuit substrate or chip and the nanostructure was formed from a thermally or electrically conductive material then there would be an attractive force and the molecules from the first and second surfaces would have an intermolecular force to the conductive nanostructures. Therefore with the nanostructures of the prior art being a

thermally or electrically conductive material and the first and second surfaces are a circuit substrate (Column 3, line 63) then they would be attracted by an attractive force (intermolecular force)).

Claims 15-17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown in view of Shin et al. (U.S. Publication 2002/0014667).

In re claim 15, Brown discloses a nano-interconnection structure (Fig. 6) that contains a first surface (10), a second surface (10'), a first plurality of nanostructures (4a) and a second plurality of nanostructures (4b). Brown discloses all the limitations except for an intermediate layer. Whereas Shin discloses a nanotube device (Fig. 12b) that contains a first plurality of nanostructures (20) disposed on one side of an intermediate layer (30, metal) and a second plurality of nanostructures (20) disposed on an opposing side of said intermediate layer, intermediate layer configured to be positioned between first and second surfaces such that first plurality of nanostructures adhere to first surface and second plurality of nanostructures adhere to second surface. The metal intermediate layer is formed to act as a junction between the first and second plurality of nanostructures. (Page 4, Paragraph 0066) Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Brown by incorporating an intermediate layer to act as a junction between the first and second plurality of nanostructures as taught by Shin.

In re claims 16 and 21, Brown discloses the first plurality of nanostructures adhere to first surface using attractive forces and second plurality of nanostructures adhere to second surface using attractive forces. (In regards to the nanostructures

being attached by an attractive force, as stated in applicant's specification (Page 3, lines 10-21) that there would be an attractive force (intermolecular force) if the first and second surfaces were formed by a circuit substrate or chip and the nanostructure was formed from a thermally or electrically conductive material then there would be an attractive force and the molecules from the first and second surfaces would have an intermolecular force to the conductive nanostructures. Therefore with the nanostructures of the prior art being a thermally or electrically conductive material and the first and second surfaces are a circuit substrate (Column 3, line 63) then they would be attracted by an attractive force (intermolecular force)).

In re claim 17, Brown discloses the first plurality of nanostructures and second plurality of nanostructures form a conductive connection between the first and second surfaces. (Column 3, lines 50-55)

Response to Arguments

Applicant's arguments filed 9 January 2007 have been fully considered but they are not persuasive. Applicant argues that the 112 2nd rejection to claim 8 in regards to the dipole-dipole forces. The specification is silent on what causes the dipole-dipole forces between the first and second surfaces. The specification does discloses the intermolecular forces that cause the Van Der Waal forces and it being the formed between the molecules of the nanostructures and the circuit substrate and the nanostructures being thermally or electrically conductive and discloses the same circuit substrate then the Van Der Waal force would be formed. In regards to the dipole-dipole

forces the specification is silent on what causes the attraction between the surfaces, is it the material it is made of or how it is bonded together, it is unclear. Therefore the rejection stands. In regards to the argument that the Brown reference does not disclose the attractive forces as previously discussed in the previous office action and the previous arguments the specification of the present application (Page 3, lines 10-21) discloses what causes the attractive forces intermolecular forces (Van Der Waal forces). If the first and second surfaces were formed by a circuit substrate or chip and the nanostructure was formed from a thermally or electrically conductive material then there would be an attractive force and the molecules from the first and second surfaces would have an intermolecular force to the conductive nanostructures. Therefore with the nanostructures of the Brown reference being a thermally or electrically conductive material and the first and second surfaces are a circuit substrate (Column 3, line 63) then there would be an attractive force (intermolecular force, Van Der Waal). Therefore the rejection stands.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on T-F 8:30-6:00 off Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KLR
April 1, 2007